



Sustainable Pathways

Addressing
Infrastructure Needs
in the Caribbean

Executive Summary

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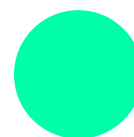
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A region with multiple challenges



The Caribbean comprises islands and continental states and territories bordering the Caribbean Sea and parts of the Atlantic Ocean. These are characterised by limited territorial extension, geographic remoteness, and high exposure to extreme climatic events. Moreover, the region shares with other developing nations several challenges related to the development and maintenance of resilient infrastructure, including resource scarcity, limited financing options, weak infrastructure governance, and insufficient availability of

human capital. All of these factors impact the effectiveness of public policies.

This report focuses on 14 states and one territory (see Table ES.1), which share the common characteristic of being either member states or territories of the Caribbean Community (CARICOM) or protocol members of the Organisation of Eastern Caribbean States (OECS). This selection reflects a range of productive, social, and environmental challenges, effectively capturing the region's heterogeneity.

Table ES.1
Selected states and territories of the Caribbean region

Source: Authors based on World Bank (n.d.), IMF (n.d.), Organisation of Eastern Caribbean States – OECS (n.d.), and Eastern Caribbean Central Bank (n.d.).

Country	Surface area (sq. km)	Total population, 2023	GDP, 2023 (current USD bn)	GDP per capita, 2023, (USD purchasing power parity 2021)	CARICOM	OECS
OECS SIDS						
Antigua and Barbuda	440	94,298	2.0	28,666	MS	PM
Dominica	750	73,040	0.7	15,863	MS	PM
Grenada	340	126,183	1.3	15,913	MS	PM
St. Kitts and Nevis	260	47,755	1.1	30,108	MS	PM
St. Lucia	620	180,251	2.5	22,650	MS	PM
St. Vincent and the Grenadines	390	103,698	1.1	17,915	MS	PM
Montserrat (territory)	104	4,294	0.1	26,440*	MS	PM
Regional Hubs						
Bahamas	13,880	412,623	14.3	32,048	MS	
Barbados	430	281,995	6.4	17,448	MS	
Jamaica	10,990	2,825,544	19.4	10,343	MS	
Trinidad and Tobago	5,130	1,534,937	28.1	28,458	MS	
Continental Caribbean						
Belize	22,970	410,825	3.3	12,795	MS	
Guyana	214,970	813,834	16.8	49,812	MS	
Suriname	163,820	623,236	3.8	18,971	MS	
Fragile State						
Haiti	27,750	11,724,763	19.9	2,934	MS	

Notes: MS: Member State; PM: Protocol Member. * GDP Montserrat valued at region average. Except for the territory of Montserrat, all states also belong to the Association of Caribbean States (ACS).

Land and population size, geographic location, geological origin, history, and relative resource richness interact to shape the economic composition of each Caribbean country. **An analysis of the region's integration into global trade reveals three distinct groups: (i) fossil-fuel exporters; (ii) service exporters; and (iii) other commodity exporters.**

Fossil fuel exporters, such as Trinidad and Tobago and Guyana, are located near South America's northern coast and hold significant proven oil and gas reserves. In contrast, many non-resource-rich nations have specialised in services, mainly tourism and financial services.

The travel and tourism sector plays a critical role in small islands like Antigua and Barbuda (87.1% of GDP), St. Lucia (65.7%), Grenada (51.7%), the Bahamas (41.9%), and Barbados (21.1%) (based on 2023 data).¹ Financial services also represent a vital sector in countries like The Bahamas and Barbados where offshore operations generate 9% and 6.8% of their GDP, respectively. Additionally, Jamaica and The Bahamas—and to a lesser extent Barbados and Trinidad and Tobago—serve as important regional hubs.

Finally, countries that do not export energy or services tend to be among the poorest in the region. Suriname, Haiti, and Belize are in this group, with low per capita exports primarily concentrated in agriculture and mining.

Macroeconomic context

Long-term average growth in the Caribbean region has been low and trending downward.

Between 1970 and 2010, the region's annual growth rate averaged 2.0–2.3%, well below the 7% recorded in the 1960s. Slower growth over the past decade (2010–2020) is linked to less favourable demographic trends—such as an ageing population and fewer young people entering the labour market—alongside significant debt overhangs in many countries and a less dynamic global economy, particularly in Europe, a key trade partner in services.

The collapse in GDP and the widening of fiscal deficits during the pandemic significantly increased public debt across the Caribbean, prompting fiscal consolidation processes in several countries. In Trinidad and Tobago, the debt-to-GDP ratio rose by 7 percentage points (pp) from 61.2% in 2019 to 68.2% in 2020, to later recover to 59% in 2024. In Barbados, which was already undergoing a process of fiscal consolidation, debt-to-GDP deviated from its downward trend and surged 19.2 pp in 2020 reaching 136.5% before subsequently declining to 103.2% in 2024. In Jamaica, the debt-to-GDP ratio stood at 85% in 2013 and almost 68% in 2024 (having evolved in an inverted-U fashion with a peak of over 100% in 2020). Fiscal prudence in

most countries, coupled with favourable prices for energy-exporting economies, has helped bring economies back to a more solid fiscal footing.

Post-COVID recovery has been slow, uneven, and protracted. It took three years (until 2022) for the region to return to pre-pandemic GDP levels. During that period, increases in energy prices and post-pandemic restructuring of air traffic routes drove up airfares, further depressing international travel. Additionally, real exchange rate appreciation and economic downturns in key global markets curtailed tourism flows—severely affecting the region's tourism-dependent economies.

With tourism still recovering, **current account deficits have widened in several countries, making it harder to bridge the foreign financing gap.** Excluding Trinidad and Tobago and Guyana—where energy exports play a major role—current account deficits were, on average, over 10% of GDP between 2020 and 2022. Although tourism receipts are helping narrow these deficits, foreign reserves and other external assets have been partially depleted in recent years, according to official national accounts data. **Access to international financing remains a challenge**, particularly in the current high-interest environment.

¹ Data retrieved from WTTC (n.d.). The world average in 2023 was 9.1%.

Impact and exposure to climate change

The Caribbean is particularly vulnerable to the impacts of climate change, despite contributing only 0.5% of global greenhouse gas (GHG) emissions. However, this small contribution is significant relative to the region's size: excluding Haiti (which skews the regional average due to its current socioeconomic situation), per capita GHG emissions in the Caribbean region exceed those in LAC and other SIDS, while emissions per unit of GDP exceed those in OECD and other SIDS, indicating significant potential for decarbonisation.

Due to its geographical location, the Caribbean is one of the developing regions most at risk from climate change-related

natural disasters relative to its economic size. Hurricanes, flooding, and rising sea levels pose significant threats to infrastructure and economies. Between 2010 and 2024 (Table ES.2), the region suffered substantially greater impacts from natural disasters compared to other parts of Latin America: per capita loss of life in the Caribbean was 260 times higher and damages were between 10.9 and 12.3 times greater than those in South America and Central America—despite fewer recorded natural disasters. For a relatively small region, reconstruction costs totalled USD 17.8 billion, similar to that of South America, which experienced 150% more disasters during the same period.

Table ES.2
Disasters in Latin America and the Caribbean, 2010–2024

Source: Authors based on EM-DAT (n.d.).

Indicator	South America	Central America and Mexico	The Caribbean* ¹
Number of disasters	509	276	203
Most frequent disasters	Floods, landslides and earthquakes	Storms, floods, and earthquakes	Storms, floods, and epidemics
Deaths	11,531	4,491	235,078
per million inhabitants	27.6	25.2	6,987.6
People left homeless	1,101,692	129,883	471,407
per million inhabitants	2,696	729	9,179
Total damage (in billion USD)	100.8	53.8	126.5
Relationship to GDP* ²	26.8	30.2	329.1
Insured damage (in billion USD)	13.5	11.2	40.8
Cost of reconstruction (in billion USD)	19.0	1.3	17.8

Note: “People left homeless” reflects the number of persons whose home was destroyed or severely damaged, and who needed shelter after the disaster. “Total damage” includes the destruction of physical assets (infrastructure, production, the environment, and others). “Insured damage” refers to the proportion of total damage covered by insurance companies. “Cost of reconstruction” includes expenditure on replacing destroyed assets and investment in preparation and mitigation for future events. Damage is measured in 2022 constant values.

*¹ Caribbean includes all states from Table ES.1 plus the Dominican Republic and the rest of the Caribbean. South America excludes Suriname and Guyana (included under the label Caribbean). Central America and Mexico exclude Belize, included in Caribbean). *² Ratio between Damages (USD billion) and GDP (USD trillion).

Implications of the macroeconomic landscape for infrastructure services

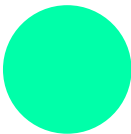
Many of the Caribbean's most pressing economic, social, and sustainability challenges are intricately linked to infrastructure. Key issues include limited access to essential services, insufficient service quality, high costs, and weak resilience to extreme weather events.

The current state of public finances in the Caribbean—marked by high levels of debt and fiscal constraints—limits governments' capacity to independently undertake transformative infrastructure investments. These challenges are further compounded by the financial strain on national budgets caused by frequent climate-related disasters.

On average, Caribbean countries allocate 4.8% of their GDP to capital expenditure, similar to the LAC average of 4.3% but significantly less than that of advanced economies (over 8%). Notably, eight out of 14 Caribbean nations—Haiti, Barbados, Trinidad and Tobago, Antigua and Barbuda, the Bahamas, Jamaica, Suriname, and Saint Lucia—fall below the LAC average.

Given these constraints, governments in the region need to adopt strategies that effectively leverage private capital and international financial support to fund critical infrastructure projects. Additionally, efficient investment in sustainable and resilient infrastructure offers a pathway to address some of the region's most pressing developmental constraints. Alongside direct investment, prioritising improvements in the “soft” components of infrastructure—such as institutional capacity and regulatory frameworks—can play a pivotal role in closing existing gaps.

Infrastructure services in the Caribbean: Status and challenges



This report examines critical infrastructure sectors essential for sustainable development in the Caribbean: energy, logistics and transport, digital communications, and water and sanitation, which are key to fostering productivity gains and economic integration, while also promoting social inclusion.

To conduct the sectoral assessment of infrastructure sectors, this report relies on both quantitative and qualitative analyses and covers five dimensions: **access, quality, affordability, environmental friendliness, and resilience.** Figure ES.1 summarises the results using a heatmap format.

Figure ES.1
Sectoral assessment

Source: Authors based on quantitative and qualitative assessments. See details in the main report.

	Access	Quality	Affordability	Environmental Friendliness	Resilience
Energy	Good	Regular	Poor	Poor	Regular
Road transport	Good	Regular	Good	Regular	Poor
Maritime transport	Regular	Regular	Poor	Regular	Regular
Air transport	Regular	Poor	Regular	Regular	Regular
ICT	Regular	Regular	Poor	Regular	Regular
Water & sanitation	Regular	Regular	Regular	Poor	Poor

Poor
 Regular
 Good

Energy

While most Caribbean countries have achieved **near-universal access to electricity**, the region's energy landscape is still largely defined by a **heavy reliance on imported fossil fuels**—especially petroleum products used for electricity generation and final consumption (Figure ES.2)—and **high energy prices**.

Moreover, the **quality of energy services remains a pressing concern** throughout the region. High costs, frequent power outages, and service interruptions have a detrimental effect on the competitiveness of Caribbean economies, particularly in key sectors such as tourism and manufacturing. Residential electricity prices are 55% higher on average than in Latin America, while the frequency of outages more than doubles that of LAC and is seven times that of the United States.

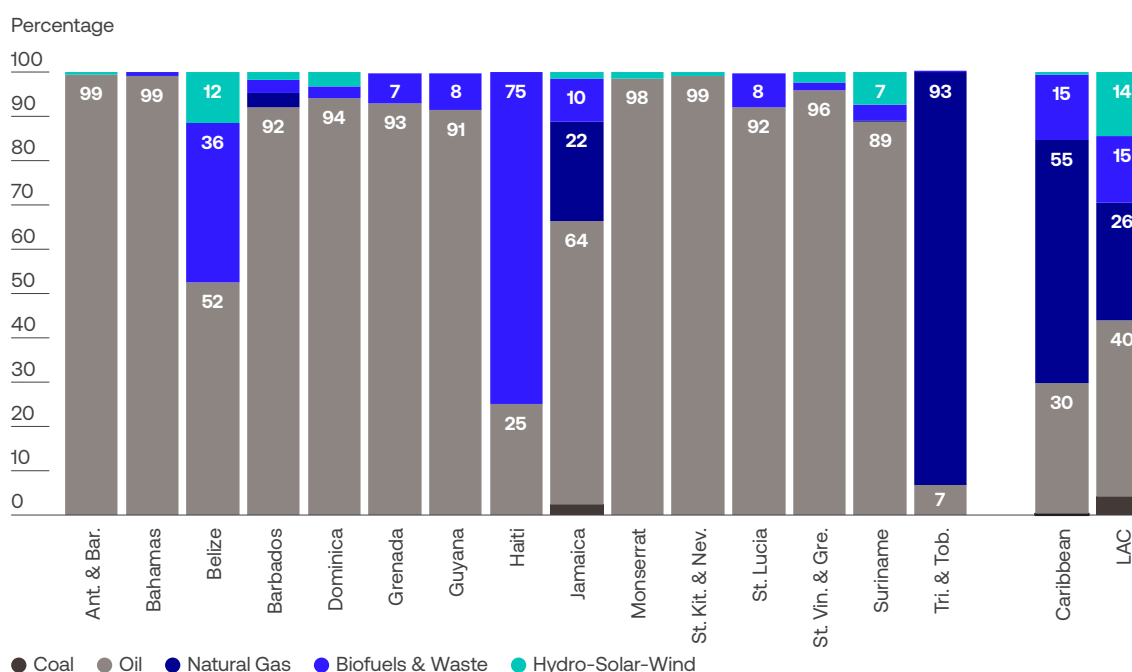
Electricity losses further reduce availability and increase provision costs. These losses are particularly significant in continental countries and in Jamaica, where they range from 12% to 26% of electricity supply, and Haiti, with losses reaching a staggering 60% of supply.

Financing constraints are also significant, with many Caribbean countries facing difficulties in funding large-scale energy investments due to economic constraints and high national debt levels.

Energy infrastructure is particularly vulnerable to climate impacts in the Caribbean, where tropical storms often cause severe disruptions and damage (e.g., Jamaica in 2021). However, measures like undergrounding power lines (Saint Lucia) and decentralising energy systems (Barbados) can enhance the capacity to maintain service during such events.

Figure ES.2
The energy matrix, breakdown by country and regional averages, 2021

Source: Authors based on UNSD (n.d.) and OLADE (n.d.).



Transport and physical connectivity

Physical connectivity is a significant challenge in the Caribbean, especially for islands where land connections between countries do not exist. In this context, transport infrastructure must establish links within countries and between these island nations and the global market, facilitating the import and export of essential goods and commodities. This scenario is compounded by low productivity in logistics services, which drives up transport costs across the region.

The quality of road infrastructure is affected by deteriorating surfaces, narrow lanes, limited road safety features, and inadequate resilience standards. Many roads are ageing and suffer additional damage from heavy rainfall during tropical storms, which wash gravel and debris onto roadways. Originally, many roads

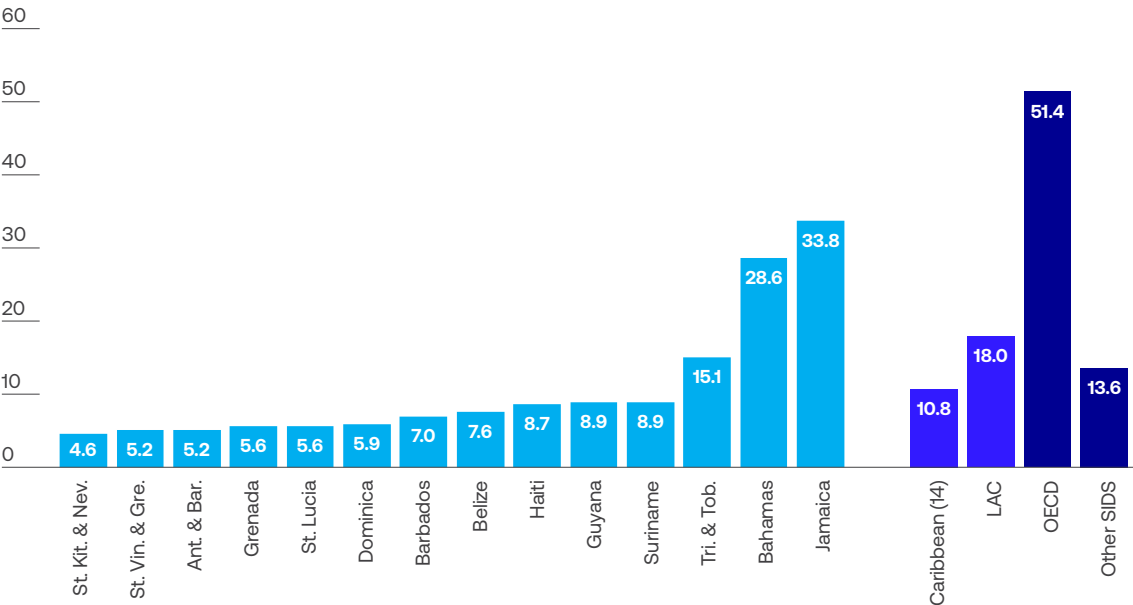
were built with limited budgets and debt-related constraints, resulting in substandard quality. Combined with institutional weaknesses in project appraisal and human resource constraints, this has contributed to their rapid deterioration (Phillips et al., 2023a and 2023b). The steady rise in vehicles numbers over the past four decades has also worsened road congestion, particularly in urban areas during peak hours.

Besides the regional hubs—Bahamas, Barbados, Jamaica and Trinidad and Tobago—**many Caribbean countries face limited connectivity and few transport options to connect to the world** (see liner and air connectivity indexes in Figure ES.3). This affects both maritime transport (vital for trade) and air transport (critical for tourism).

Figure ES.3
Maritime (Panel A) and Air (Panel B) transport connectivity indexes

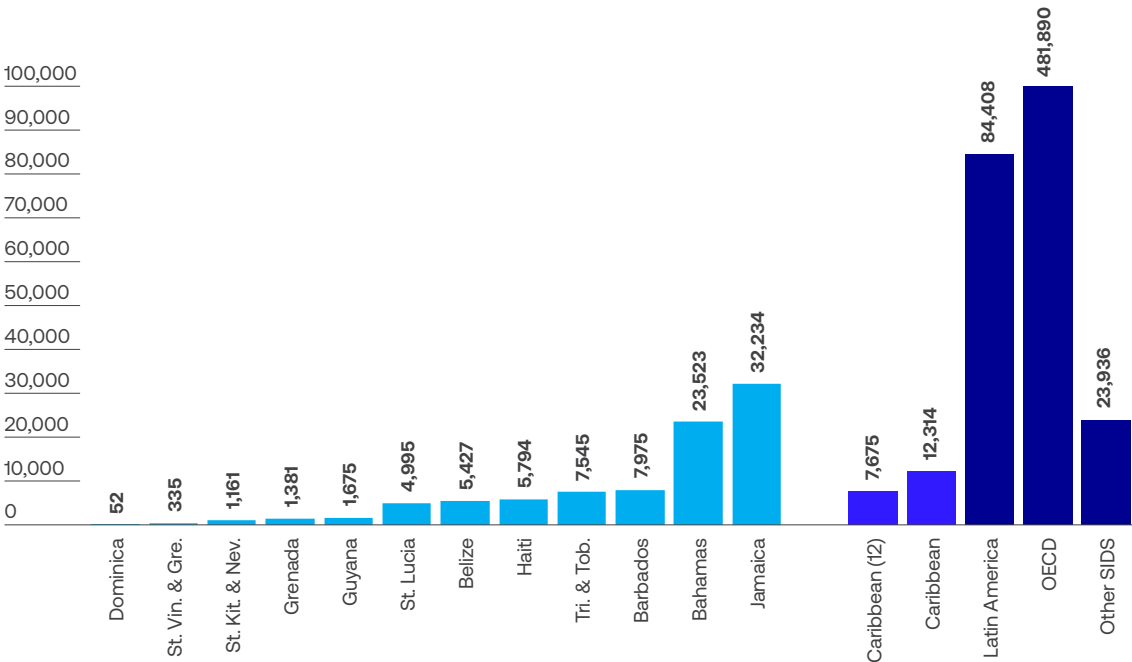
Sources: Authors based on World Bank (n.d.). Caribbean (14) includes the countries listed in the figure (Panel A). IATA (2020). Caribbean (12) includes the countries listed in the figure. Caribbean includes the full list of Caribbean countries in IATA (Panel B).

Panel A. Liner Shipping Connectivity Index, 2021



Continued on the next page →

Panel B. IATA Air Connectivity Index, 2019



Ports in the Caribbean show considerable disparities in infrastructure quality and operational efficiency. Large ports—such as Kingston in Jamaica (among the busiest in Latin America and the Caribbean) and Freeport in The Bahamas—benefit from modern equipment, including gantry cranes, allowing them to operate at productivity levels comparable to global benchmarks (like Manzanillo in Panama). In contrast, smaller ports rely on mobile cranes or outdated infrastructure and struggle with efficiency in terms of logistic performance and costs (e.g., St Georges in Grenada). These inefficiencies contribute to high port operation costs, which have significant ripple effects on island economies reliant on maritime trade (Hope Economics, 2024b).

For air transport, the lack of connectivity is partly linked to disparities in airport infrastructure quality (see Figure ES.3). While some airports in major tourism hubs are modern and equipped to handle high volumes of passengers and cargo, others—especially in smaller islands—struggle with outdated facilities, limited capacity, and poor route connectivity. These infrastructure gaps hinder tourism—a critical economic driver—and broader economic development.

Transport infrastructure is also vulnerable to extreme weather events, including hurricanes and rising sea levels, which can disrupt services and damage infrastructure. These events have repeatedly caused severe damage to roads, bridges, and related infrastructure, often resulting in sections being washed away or destroyed. Also, damage to critical airport and port infrastructure can result in extended service interruptions, which severely impact the tourism industry and overall economic activity. With climate change expected to intensify tropical weather systems, and much of the region’s economic activity, including tourism, concentrated in vulnerable coastal areas, the need for resilient infrastructure has become increasingly critical.

The range of challenges facing the transport sector contributes to high logistics costs. These costs pose a substantial barrier to improving productivity and limit efforts to diversify economies. The lack of efficient, integrated, and resilient transportation systems restricts the region’s ability to maintain smooth logistics and integrate into trade flows or regional and global value chains. Closing these infrastructure gaps is essential for improving competitive positioning and fostering sustainable economic development through diversified trade and investment.

ICT

While mobile and broadband access has expanded across the Caribbean, the region exhibits considerable heterogeneity in coverage levels. For instance, Saint Kitts and Nevis boasts broadband access comparable to that in the United Kingdom, while Antigua and Barbuda has only a quarter of this coverage level. On the other hand, the **quality of mobile and broadband services across the Caribbean is inconsistent**, with many areas experiencing issues such as slow speeds, frequent interruptions, and limited bandwidth.

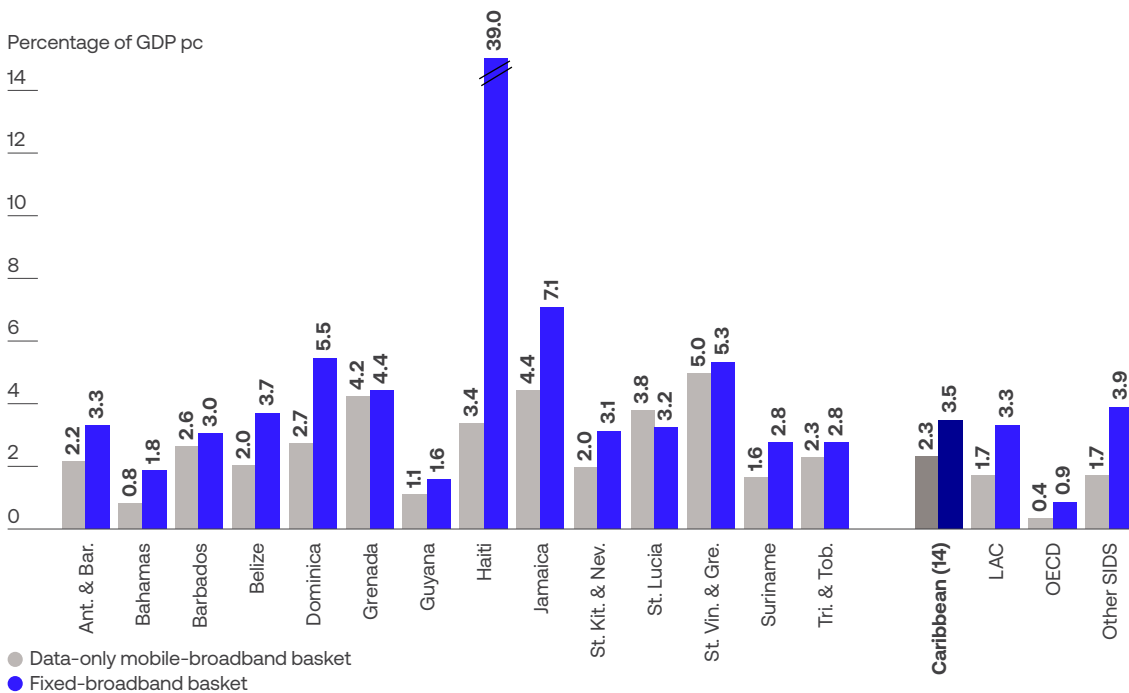
Affordability remains one of the most pressing issues in the Caribbean's digital landscape, as high costs for mobile and

broadband services restrict access for lower-income populations (see Figure ES.4). The financial burden of these services can be burdensome: in Jamaica, for instance, having access to fixed broadband can cost monthly 8% of its GNI per capita, 4 times the target set for affordability by the ITU Broadband Commission for Sustainable Development by 2025.

Beyond pricing, users also consider the benefits of service usage when deciding to subscribe. To leverage those benefits, consumers must develop the ability to effectively utilise ICT services, highlighting the need for programmes to enhance digital literacy.

Figure ES.4
Data-only mobile-broadband basket and fixed-broadband basket, 2023 (% of GDP per capita)

Source: Authors based on ITU (n.d.) and World Bank (n.d.).



According to the CAF Observatory of the Digital Ecosystem (2024), Caribbean countries range from intermediate performers in the **green digital economy** pillar (Jamaica and Barbados) to lagging positions (Haiti and Trinidad and Tobago). In addition, **telecommunications and digital service infrastructure are vulnerable to hurricanes and extreme weather as well**

as to human intervention. It is therefore essential to strengthen ICT resilience through the implementation of robust designs with redundant systems, alternative data pathways, and durable materials, as well as comprehensive disaster preparedness plans and advancements in cloud computing and cybersecurity.

Water and sanitation

Despite progress in expanding access to water services, significant gaps remain in the quality and reliability; for instance, when applying more stringent measures for water access coverage rates in the countries with information fall significantly. Many rural and underserved urban areas face inadequate access to safe drinking water.

Sanitation is an issue in the region. Coverage of sanitation services is limited across the region, which negatively impacts public health, economic productivity, and social equity. Moreover, **wastewater treatment in the Caribbean is similarly limited;** inadequate facilities contributing to contamination of water sources, coastal pollution, and public health risks. Improving wastewater management is needed not only for environmental protection but also for promoting tourism, safeguarding marine ecosystems, and improving overall public health.

A key inefficiency in the provision of water services is that utilities across the region struggle with high non-revenue water (NRW) rates, often exceeding 50%, leading to substantial financial losses and inefficiencies in the distribution and loss of natural resources.

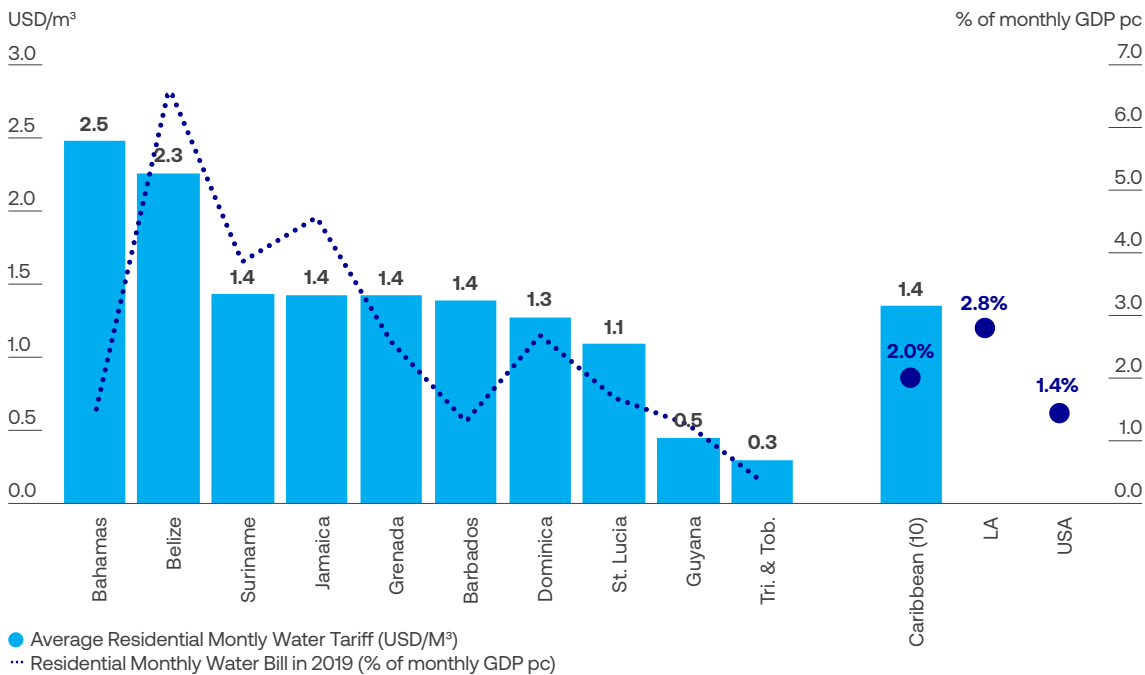
Affordability of water services varies widely across the Caribbean, reflecting significant heterogeneity in pricing and subsidy structures (Figure ES.5). This disparity underscores the need for regionally tailored policies that balance affordability with financial sustainability, ensuring that all populations can reliably access safe water without placing an undue economic burden on vulnerable populations.

The Caribbean islands have some of the lowest levels of water availability in the LAC region, and the impacts of climate change are expected to exacerbate the challenge of securing adequate access to safe drinking water.

Figure ES.5

Tariff of water services per cubic metre and total bill for a consumption of 15 cubic metres per month as a percentage of monthly GDP per capita, 2019

Source: Authors based on Janson et al. (2021), Cont et al. (2022) and World Bank (2024).



Note: The utilities used for each country are Water and Sewerage Corporation (The Bahamas), Barbados Water Authority (Barbados), Belize Water Services (Belize), Dominica Water and Sewerage Company (Dominica), National Water and Sewerage Authority (Grenada), Guyana Water Incorporated (Guyana), National Water Commission (Jamaica), Water and Sewerage Company Inc. (Saint Lucia), Suriname Water Company (Suriname), and Water and Sewerage Authority (Trinidad and Tobago). Caribbean (10) includes the countries listed in the figure. LA and USA contain data for 2021.

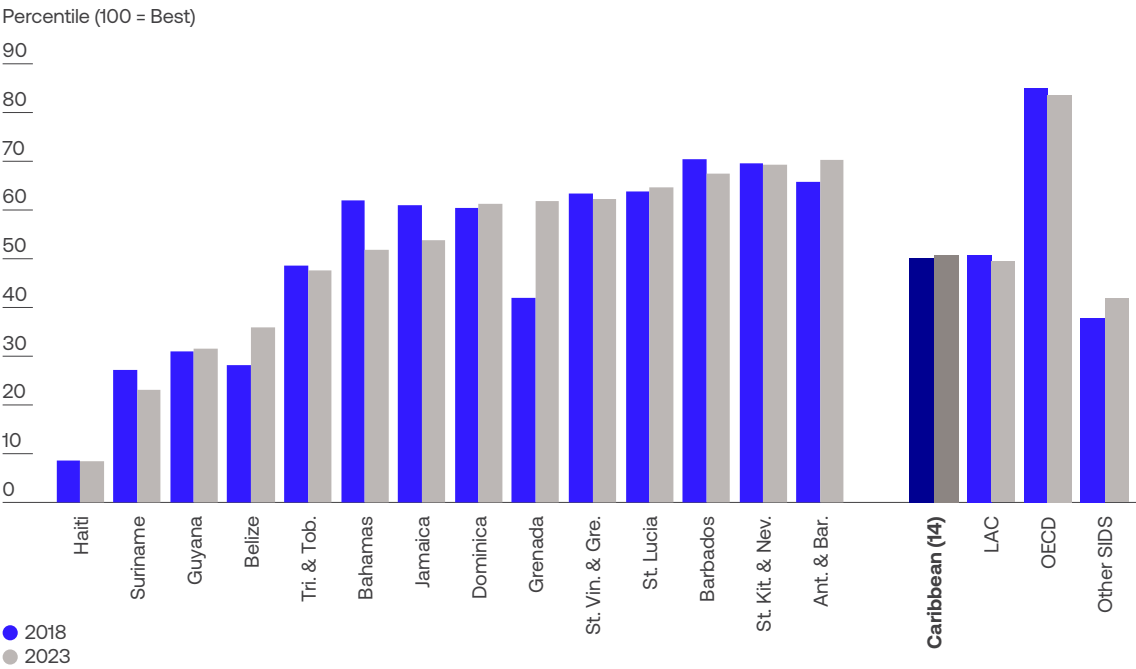
Institutional and regulatory frameworks for infrastructure in the Caribbean

The Caribbean faces considerable challenges in developing effective institutional and regulatory frameworks for infrastructure management. According to the World Bank's World Governance Indicators, the regulatory quality in the region typically ranks around the median level in the LAC context but falls well below the OECD average (see Figure ES.6). Institutional and regulatory gaps undermine the region's capacity to coordinate actions, enforce standards, and align investments with long-term development objectives.

Deficiencies in project implementation affect multiple sectors and have also hindered the performance of interventions by multilateral development banks (MDBs). For instance, the CDB reports persistent obstacles, from prolonged project timelines averaging seven years to low disbursement ratios and large amounts of undisbursed funds (CDB, 2021). One of the reasons related to the region's capacity to execute infrastructure projects efficiently is **the lack of skilled technical expertise.**

Figure ES.6
Regulatory Quality Indicator in the Caribbean

Source: Authors based on World Bank (n.d.). Caribbean (14) includes the countries listed in the figure.



Another significant area of concern is the outdated or non-existent legal and regulatory frameworks governing infrastructure sectors.

The Caribbean region exhibits a diverse and inconsistent regulatory landscape across sectors, which hampers the effective transition to sustainable development.

In the energy sector, varying levels of progress in renewable policies and a lack of independent regulatory bodies hinder investments and innovation. Outdated regulations often fail to address modern challenges such as renewable energy integration, grid resilience, and sustainable energy financing.

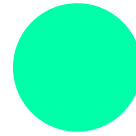
Similarly, the water and sanitation sector faces operational challenges and fragmented frameworks, limiting the effectiveness of Integrated Water Resources Management and the adoption of sustainable practices. Persistent systemic issues—such as below-cost water tariffs, political interference, and limited managerial autonomy—affect service quality and financial sustainability.

In transport, bureaucratic inefficiencies and a lack of cohesive policies obstruct the development of efficient and integrated public systems. Airport and port operations, meanwhile, are marked by varied governance issues that weaken regional resilience.

Lastly, the ICT sector, characterised by legal and regulatory fragmentation and varying stages of development, lags behind global developments. This highlights the need for a harmonised regulatory approach to support digital transformation while addressing critical challenges such as data privacy and cybersecurity.

Overall, cohesive and robust regulatory frameworks are vital for enhancing resilience, attracting investment, fostering a supportive environment for private sector engagement, and facilitating sustainable growth in the region.

Charting a path forward: Harnessing opportunities for the Caribbean



The sectoral analysis reveals that many of the common challenges for the Caribbean states covered in this study are shared with other developing nations in LAC and other parts of the world. However, the Caribbean can leverage its unique characteristics—limited land area, economies of scale, geographic remoteness, and vulnerability to climate extremes—to transform these challenges into development opportunities.

The report highlights **four cross-cutting challenges that should be viewed as opportunities for transformative change in the region's infrastructure sectors**: (i) climate change mitigation strategies; (ii) resilience infrastructure; (iii) modernising institutional and regulatory frameworks; and (iv) regional cooperation.

Mitigation as an opportunity

Despite the Caribbean's historically minimal contribution to global emissions and its severe fiscal constraints, **prioritising investments in climate change mitigation represents a strategic choice—one that aligns both with the global needs and the region's interests**. These investments offer local benefits that go beyond fulfilling international obligations. By adopting mitigation strategies, Caribbean nations can enhance economic resilience, improve service delivery, and reduce overall costs, making this path feasible and necessary for sustainable development.

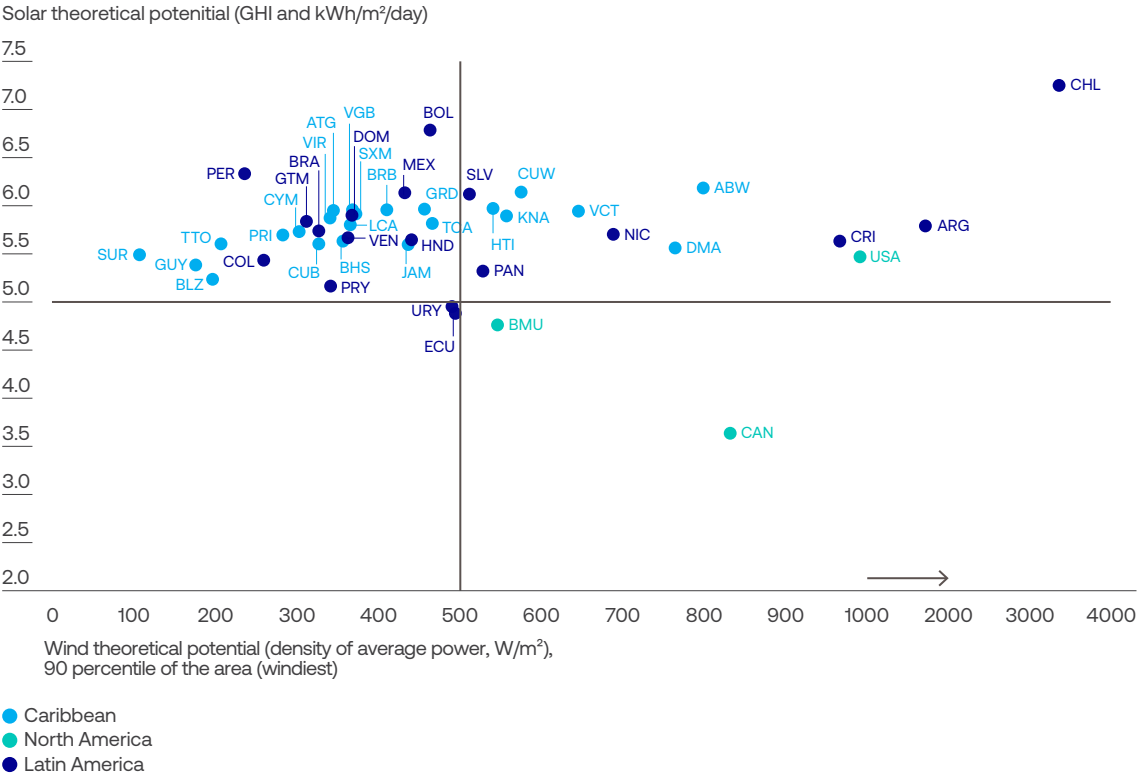
Two clear examples illustrate the potential of mitigation strategies to improve the standards of access, quality, and cost of infrastructure services.

First, **transitioning to renewable energy sources in electricity generation can deliver multiple benefits**. The Caribbean possesses strong potential for wind and solar energy, with many countries enjoying solar irradiance levels above the global average (see Figure ES.7). Shifting from imported fossil fuels to locally sourced renewable energy can reduce generation costs, limit exposure to volatile global fuel prices, and decrease dependency on external energy supplies.

This transition also strengthens the resilience of energy services, helping to ensure reliable and continuous delivery even during climate-induced disruptions. However, integrating renewable energy into national grids requires effective energy planning to manage generation intermittency and fully harness the benefits of these technologies.

Figure ES.7
Theoretical potential of wind and solar energy

Source: Authors based on Allub et al. (2024).



Note: lines correspond to world averages.

Second, **reducing NRW contributes to climate change mitigation** by decreasing energy and chemical use in water treatment and distribution. This helps Caribbean countries achieve cost savings, improve resource conservation, and promote social equity, making it a critical component of a broader mitigation strategies.

NRW reduction involves minimising leaks, optimising distribution networks, and improving metering systems—thus conserving water, energy, and chemicals. The success of these projects depends on reliable data; however, many Caribbean utilities lack accurate information due to inadequate metering. Improving metering and management practices can help utilities obtain better data and reduce NRW, leading to significant operational and financial benefits, including lower operational costs, increased revenue, and optimised resource use.

There are successful past experiences, such as those in the Bahamas (2012), as well as recent experiences in Jamaica, where a programme reduced NRW in Kingston and Saint Andrew area by 43%, and another is ongoing in Portmore. Nonetheless, challenges remain ahead for the region.

Resilient infrastructure: Investing in the future rather than controlling damages from the past

The Caribbean is particularly vulnerable to the impacts of climate change, as extreme events not only disrupt economies but also have long-term effects on infrastructure, public health, and social stability. There is an urgent need to shift from developing instruments that help countries recover from catastrophic events to investing in **infrastructure adaptation that minimises the economic and social costs of climate change and breaks the cycle that leads to underdevelopment traps.**

When resources are repeatedly diverted toward disaster recovery rather than long-term improvements, countries struggle to achieve meaningful progress. By prioritising climate-resilient infrastructure, the region can reduce the frequency and severity of service disruptions, safeguard economic growth, and shift the focus from reactive recovery to proactive development. The **advantages of developing resilient infrastructure are significant from both sectoral and macroeconomic perspectives.**

Taking a macroeconomics approach, **the report compares public investment in resilient versus standard infrastructure** in three countries with varying levels of risk: Barbados (low/late impact), Jamaica (mid-level impact), and Dominica (high/early impact). Resilient infrastructure reduces damage from natural disasters, protecting total capital—private and public alike. Standard infrastructure, although cheaper, does not offer the same

level of protection. In addition, resilient infrastructure generally has higher returns and lower depreciation than standard alternatives, increasing the productivity of private capital and employment, even in the absence of extreme climate events.

Under these assumptions, **investing in resilient infrastructure consistently mitigates the negative economic impacts of extreme climate events across all countries analysed.**

It reduces GDP losses and stimulates growth even before disasters occur, through enhanced private investment and employment. The degree of mitigation depends on the scale of investment relative to the size of the climate shock (Figure ES.11).

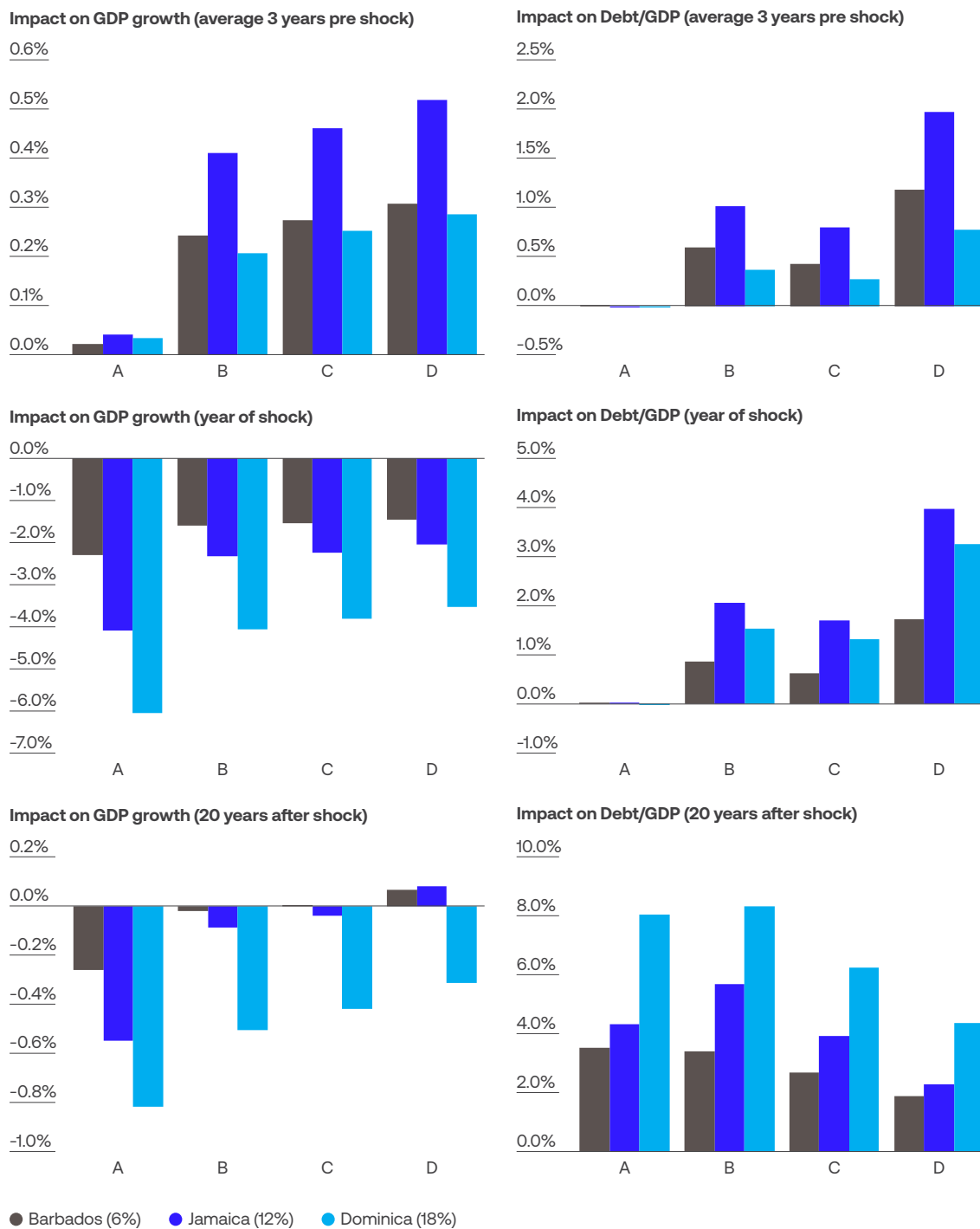
Moreover, such investments generally improve the public debt-to-GDP ratio over the medium and long term by accelerating recovery and reducing reconstruction costs—though a temporary increase may occur in the short to medium term. The case of Jamaica, where a low tax burden delays effective debt reduction, illustrates this point.

While creating a contingency fund alongside resilient investments provides modest benefits for GDP recovery and improves medium-term debt dynamics, it also further raises pre-event debt levels. Finally, financing these investments with concessional debt can further improve debt sustainability.

Figure ES.11

Impact of investment in resilient infrastructure on GDP growth and national debt

Source: Authors based on a model adapted from Arreaza et al. (2023).



Notes: The name of the country and the percentage represent a case of impact (e.g., 6% of damage in Barbados, which occurs in year 8 after the beginning of the exercise; 12% of damage in Jamaica in year 5, and 18% of damage in Dominica in year 4). Each simulation includes the impact on GDP growth and Debt/GDP in three periods of time: the average of three years before the shock, the year of the shock, and the year 20 after the shock. Scenario A corresponds to standard investment; Scenario B corresponds to investment in resilient infrastructure; Scenario C corresponds to resilient infrastructure financed with concessional funds; and Scenario D includes the creation of contingency funds.

Modernising frameworks for sustainable development

An analysis of various infrastructure sectors in the Caribbean reveals that **many deficits stem from governance, institutional, legal, and regulatory shortcomings**. While addressing these challenges presents obstacles, it also creates opportunities. Some governance improvements require the adoption of best practices rather than substantial financial investments. Smart reforms can improve the quality of infrastructure services and transform the way investment is funded and financed.

In the Caribbean, a pressing challenge highlighted by the OECD (2020) is the **limited institutional capacity**, which hampers effective implementation of infrastructure project. Governments would benefit from prioritising capacity-building programmes tailored to infrastructure-related institutions. At the regional level, CARICOM promotes collaboration among member states to address shared infrastructure challenges, exchange best practices, and pool resources and knowledge to enhance resilience and reduce costs. By leveraging these networks, Caribbean nations can build institutional capacity while also lowering costs through shared resources and expertise.

Additionally, updating and modernising **regulatory frameworks** is a critical step in advancing infrastructure development across the region—particularly in the energy sector. Notable progress includes Belize’s new guidelines for renewable energy systems, Grenada’s climate adaptation initiatives in water management, and Guyana’s community-based water and sanitation programme. Belize and Jamaica have established comprehensive regulatory frameworks for water services, enhancing accountability and efficiency. These

initiatives reflect innovative approaches to tackling infrastructure challenges and improving service delivery.

Alongside efforts in capacity building and robust regulations, the improvement of skills, resources, and coordination within government agencies enables more strategic decision-making, efficient resource allocation, and the successful implementation of complex infrastructure projects, including those involving public-private partnerships (PPPs).

For example, integrating public investment planning with **PPP frameworks** can improve resource allocation and project prioritisation. Saint Lucia’s inclusion of PPPs in its medium-term public investment strategy serves as a best-practice model. Dedicated PPP legislation can address governance gaps and reduce fiscal risks, while appropriate fiscal incentives can attract private investment—provided their impact on public finance sustainability is carefully considered.

The Caribbean’s vulnerability to climate change underscores the need to **embed sustainability and resilience into infrastructure governance**. Saint Lucia is enhancing road infrastructure resilience through vulnerability assessments, climate-resilient materials, and engineering solutions (Hope Economics, 2024a). Grenada has incorporated climate resilience measures into national development planning, offering a replicable framework for other countries (Ministry of Finance, Planning, Economic, and Physical Development of Grenada, 2019). Institutionalising these practices ensures the long-term functionality and adaptability of infrastructure systems.

Building regional synergy for infrastructure development policies

Regional cooperation is crucial to overcoming the limitations of small economies of scale in the Caribbean's infrastructure sectors.

Coordinating efforts, pooling resources, and **implementing joint projects** can reduce costs, improve service delivery, and enhance investment efficiency—making the region more attractive to international investors.

One often-cited example is the development of a regional ferry system to address inadequate shipping connections. However, inter-island trade volumes in the Eastern Caribbean are insufficient to justify a customised service. This suggests the need to find a more viable solution—one that may primarily serve another market and treat inter-island trade as a secondary market.

Additionally, the Caribbean's reliance on trade taxes (i.e., import duties) over income taxes undermines regional integration and short sea shipping, contributing to inefficient customs procedures. Revising this tax structure would better support infrastructure development and economic cooperation.

Without joint actions, individual national policies often lead to inefficiencies and suboptimal resource use. The same holds true for air transportation planning, which is central to the region's tourism sector. A regional approach to develop modern and efficient air transportation hubs can help mitigate operational risk for airlines operating in the region. By adopting a holistic perspective, countries can improve connectivity, lower costs, and create a more attractive environment for

international investment—ultimately enhancing infrastructure investment effectiveness and cost-efficiency.

Initiatives in this direction are not new. The Caribbean has made substantial efforts to enhance cooperation and policy coordination, recognising integration as critical for sustainable development. CARICOM, the OECS, and the ACS are central to this endeavour. While these entities represent noteworthy efforts towards a more integrated and collaborative Caribbean, there is significant potential to leverage these frameworks even further.

A pioneering example of regional collaboration is **the harmonisation of regulations** through the Eastern Caribbean Telecommunications Authority (ECTEL).² Established in 2000 under the support of the OECS Telecommunications Reform Project, ECTEL is the world's first regional telecommunications regulatory authority. This regional approach has expanded services, increased competition, and significantly reduced telecommunications costs—demonstrating the benefits of collective action (World Bank, 2006).

Coordination and cooperation in infrastructure policies and institutions represent a pivotal opportunity for the Caribbean to advance its development goals.

By harmonising regulations, pooling resources, and implementing regional strategies, countries can overcome challenges posed by limited economies of scale, fragmented markets, and resource constraints.

² <https://www.ectel.int/ectel-history>.

Financing the future: Innovative approaches for the Caribbean

The Caribbean faces a significant challenge related to fiscal constraints, which limits the region's capacity to make the investments needed in its infrastructure sectors. Moreover, many infrastructure service providers face financial challenges, including a decline in profitability. As a result, **Caribbean nations must seek alternative and innovative financing mechanisms** to meet the growing demand for economic infrastructure, such as private sector involvement, public-private partnerships (PPPs), green bonds, and international funding from development banks.

Governments are increasingly turning to **private participation** to meet infrastructure needs, leveraging its efficiency, innovation, and technical expertise. This strategy has been particularly effective in large-scale energy projects such as renewable energy and energy efficiency initiatives. **PPPs** offer a structured framework that integrates climate resilience into project planning and execution through improved risk management and fiscal transparency.

Additionally, various financial instruments—including **green, climate, and catastrophe bonds**, as well as infrastructure bonds backed by government revenues or international guarantees—enable both immediate post-disaster funding and long-term investment. These tools ensure that critical infrastructure projects can move forward even under adverse conditions.

Multilateral organisations such as CAF play a pivotal role in addressing the Caribbean's infrastructure financing challenges. In a region with constrained fiscal capacities, they provide guarantees and risk-sharing mechanisms to unlock public and private investment, bring technical expertise, and facilitate access to innovative financial instruments. By offering technical assistance and capacity-building support, CAF helps countries design and

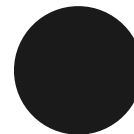
implement effective financial instruments tailored to their specific development needs. Bridging financial gaps and bolstering investor confidence, they drive infrastructure development that strengthens economic growth, enhances climate resilience, and supports the region's long-term progress.

CAF remains deeply committed to supporting regional integration, sustainable development, and inclusive growth in Latin America and the Caribbean. Since the opening of the Regional Management Office for the Caribbean in 2022, **CAF has been steadfast in deepening its engagement with the region** by expanding its operations, technical assistance, and knowledge exchange with governments, the private sector and development partners. This focused engagement is evidenced by The Bahamas joining as a Series C Shareholder, while Antigua and Barbuda, Dominica, and Grenada are at an advanced stage in their incorporation process—strengthening Caribbean representation in CAF alongside existing Caribbean shareholders Trinidad and Tobago, Barbados, and Jamaica.

Additionally, CAF has signed landmark partnership agreements with key regional institutions, including the Caribbean Development Bank (CDB), Caribbean Development Fund (CDF), The University of the West Indies (UWI), Organisation of Eastern Caribbean States (OECS), Commonwealth Secretariat, and others. CAF has also utilised its expertise and support to advance the Caribbean's green, blue, and just energy transition efforts, while reinforcing its network with regional partners and addressing the unique challenges faced by Small Island Developing States (SIDS).

This report, produced by CAF's Knowledge Management Department, contributes to these initiatives.

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